



SYSTEMS MANUFACTURING TECHNOLOGY, INC.

# PRINTECH II

## Instruction Manual

Copyright 1984

The PRINTECH II is a Parallel Interface card for the Apple II, II+ & IIfx computers. Before installing thoroughly read this manual, failure to do so can result in damage to both the PRINTECH II as well as to your Apple computer.

## TABLE OF CONTENTS

Introduction.....	2
I. Installing the Printer Card.....	3
II. Strobe Edge and Width Selection.....	4
Printer Operation With The Printech II Card.....	5
Printer Commands.....	6
High Order Bit Enable/Disable.....	8
Command Summary.....	9
Using the Printech II as an 8-bit Output Port.....	9

"Made In U.S.A."

## INTRODUCTION

The Printech II is a parallel printer card designed for use in the Apple II microcomputers. It is fully compatible with APPLE's Parallel Printer Card, and will function correctly in any application calling for the APPLE Parallel Printer Card.

The Printech II has its own custom SMT on-board program which allows the user to program the card, using simple control characters, to vary printer line lengths, insert extra linefeed characters after carriage returns when required, and to turn off the monitor screen when printing, if desired, and enable or disable the 8th bit.

The Printech II can be used with most printers equipped with a 7 or 8 bit parallel interface. It can send characters to a printer at speeds up to 5,000 characters per second, but since most printers have limited data buffer storage capacity actual character throughput will be substantially lower.

The Printech II can also be used as a general purpose, 8-bit parallel output port, if desired.

## I. INSTALLING THE PRINTER CARD

(Note: Failure to follow these instructions may result in damage to both the Printech II and your Apple.)

### CAUTION!

- (1) Turn the printer and the Apple "OFF". (Power should be off when inserting or removing any card).
- (2) Take off the lid and look at the row of connectors towards the rear of the APPLE's circuit board. Each connector is numbered (0 through 7) in back of the connector. These numbered connectors are called "slots". They are numbered 0-7, from L to R viewed from the front, except Apple IIe which is numbered 1 to 7.
- (3) Plug the 26-pin flat cable connector into the mating connector on the Printech II card matching pin 1 on the card to the arrow on the connector. So that the flat cable comes out of the connector away from the board not across the board.
- (4) Install the Printech II card with the components facing to the right, as viewed from the front of the APPLE, and the cable to the back. Plug the card into any unused slot except slot #0. If possible, use slot #1. This is the most commonly used slot for printers, and, if you are using PASCAL or CP/M, you must use slot #1.
- (5) Drape the cable over the back of the case and put the APPLE's cover back on. The pressure between the lid and the case will act as a cable clamp, so that a tug on the cable will not put a stress on the connector of the Printech II card.
- (6) Plug the other end of the cable into your printer's interface connector.
- (7) Turn power to the printer and APPLE "on".

## II. STROBE EDGE AND WIDTH SELECTION

### Jumper Block

Figure 1: Position of Jumper Blocks

Jumper Block Number 1 = Strobe Edge  
Jumper Block Number 2 = Strobe Width

Most printers require a "negative edge triggered STROBE", designated by +5v on Jumper Block number 1 (located to the left of IC U1). The Jumper Block is factory preset in the negative position.

Your Printech II card has a second Jumper Block located above IC U2. If your printer requires a STROBE of length greater than 1 micro-second place the Jumper Block (J2) to the 3 micro-second place.

If the STROBE edge width signals are not clearly defined in your printer's manual, as a last resort try each position of the Jumper Blocks (J1), (J2). The printer will work properly when the correct configuration is found, and no damage will be done to either the printer or the APPLE with an incorrect configuration.

## PRINTER OPERATION WITH THE PRINTECH II CARD

In the discussion that follows, we will assume that the Printech II card is installed in slot #1. If you have used some other slot, change all references to slot #1 to the slot you have used. The term (Return) as used below signifies a single depression of the "RETURN" key.

With your Printech II card properly installed, the cable connected to the printer, the APPLE and printer powered up (with printer selected "on-line") type:

PR#1(RETURN)

This command turns the printer card on. If everything is working properly, you will see the printer do one or two carriage returns and print the prompt symbol. From this point on until you type in PR#0(RETURN) or hit RESET, everything you type in will be printed on the printer, and the monitor. Any program listing you do with "LIST" will be sent to the printer after a PR#1 command.

If nothing happens when you type in "PR#1", check to make sure your printer is plugged in and turned on, and that you have typed in the correct slot number (remember, slot 1 is actually the second slot, Apple II, II+ only, since the slot numbers start at 0). If the incorrect slot number is typed, all output will go to the wrong slot and you will "lock up" the APPLE. Depress the RESET key and begin again if this should occur.

Now type in:

PRINT 7/3 (RETURN)

The statement and its result should appear on the printer and on the monitor.

Type in:

PR#0 (RETURN)

and then

PRINT &/# (RETURN)

The "PR#0" command will turn off the Printech II card and return to the monitor as the only output device. Now the second statement and its result appear only on the monitor.

You may use the PR#1 and PR#0 commands in your own BASIC programs to selectively print portions of your program's output. For example:

```
100 PRINT "THIS LINE WILL NOT PRINT"
110 PR#1
120 PRINT "THIS LINE WILL PRINT"
130 PR #0
140 END
```

will send only the text in line 120 to the printer and monitor while the text in line 100 will be sent to the monitor only.

If you are working on a BASIC program and would like to get a program listing on your printer, type in:

```
PR#1 (RETURN)
```

and

```
LIST (RETURN)
```

This will result in your program listing being sent to the printer. After the listing is done, type in:

```
PR#0
```

to kill subsequent output to the printer.

### PRINTER COMMANDS

Upon initialization, (PR#1) a certain number of default conditions automatically exist. This allows the user to immediately use his Printech II without any additional commands. These conditions are:

```
Auto Line Feed After Carriage Return - ON
Screen Display - ON
Eighth Bit - OFF
40 Character Printing
```

All of these commands may be altered as required.

The printer commands are described below. They can be all typed in directly from the APPLE's keyboard or can be inserted in BASIC program to achieve the desired effect:

Note: In the following discussion (CTRL-I) means typing the letter "I" while holding down the CTRL key.

```
PR#(slot no.) (RETURN)
```

Turns the printer card on. The slot no. entered must be the number of the slot containing the printer card (from 1 to 7).

PR#0 (RETURN)

Turns the printer off.

Printer commands are effective only after the printer card has been turned on with PR# (slot no.) command. If you turn the card off and back on, it will again come up in its default condition:

Output to printer and monitor.  
Card set for 40 columns per line.  
Auto line feed turned ON.  
Eighth Bit OFF.

Should you desire a different configuration, you will have to repeat your command sequence each time you turn the card on.

(CTRL-I) nN

Prints "n" columns per line on the printer. The number of columns may be any number from 40 to 255. Any line sent to the printer while doing a Basic Listing command, if it is longer than the number of columns specified, will be "wrapped around" (a carriage return, linefeed will be inserted after the specified number of characters have been transmitted and the remainder of the line will be printed) on the next line.

Example: (CTRL-I) 132N will set the Printech II card up to output lines 132 characters (at most) long.

Note: The only time that this command has any effect is while doing a "BASIC" program "LIST" with the screen turned off.

(CTRL-I)I

Turns on the monitor display while sending characters to the printer.

Note: Whenever screen is turned on "BASIC" listings will default to 40 columns.

(CTRL-I) K

Disables the automatic printer line feed option. The APPLE adds a carriage return to the end of every line, and the Printech II card adds a line feed character after each carriage return. If your printer automatically adds its own line feed character after each carriage return, double spacing of printing lines may occur. If desired, the (CTRL-I)K command may be used to eliminate this extra line feed.

(CTRL-I) A

Re-enables the automatic line feed option.

(CTRL-I)(CTRL-letter)

Changes the printer command control character recognized by the printer.



## HIGH ORDER BIT ENABLE/DISABLE

Some graphics printers require the use of the eighth, or high order bit which is normally masked off during the transmission of text to printer. The high order bit may be enabled or disabled through two different techniques.

(CTRL-I) H or CHR\$(9),"H",  
Enables high order bit for graphics routines.

(CTRL-I) X or CHR\$(9),"X",  
Disables the high order bit.

PRINT CHR\$(9),"H",  
(To enable 8th bit.)

PRINT CHR\$(9),"X",  
(To disable 8th bit.)

These two commands work regardless of the slot location (Slot 1-7) of the printer interface card.

The other manner in which the graphics capability of the Printech may be enabled or disabled, is through the use of POKE instructions. The address of the POKE will depend upon the slot in which your Printech II is located.

	HEX	to enable	to disable
	Address	high order bit	high order bit
1	04F9	POKE 1273,255	POKE 1273,127
2	04FA	POKE 1274,255	POKE 1274,127
3	04FB	POKE 1275,255	POKE 1275,127
4	04FC	POKE 1276,255	POKE 1276,127
5	04FD	POKE 1277,255	POKE 1277,127
6	04FE	POKE 1278,255	POKE 1278,127
7	04FF	POKE 1279,255	POKE 1279,127

Note: On initialization the high order bit is DISABLED.

### TEST PROGRAM FOR GRAPHICS USING ESCAPE COMMANDS OR POKES:

```
100 PR#1
110 PRINT
120 PRINT CHR$(9);"H";
130 FOR I=1 TO 72
140 PRINT CHR$(213);
150 NEXT I
160 PRINT
170 FOR I=1 TO 72
180 PRINT CHR$(213) ;
190 NEXT I
200 PRINT

210 POKE 1273,255
220 FOR I=1 TO 72
230 PRINT CHR$(170);
240 NEXT I
250 PRINT
260 POKE 1273,127
270 FOR I=1 TO 72
280 PRINT CHR$(170);
290 NEXT I
300 PRINT
310 PR#0
```

## COMMAND SUMMARY

PR#N	Turn on printer card
(CTRL-I) K	Kill auto - LF
(CTRL-I) A	Append line feed to carriage return
(CTRL-I) nN	Turn off display and print n columns wide
(CTRL-I) I	Turn on display
(CTRL-I) H	Enable high order bit
(CTRL-I) X	Disable high order bit

## USING THE PRINTECH II AS AN 8-BIT OUTPUT PORT

The Printech II card can be used as a general purpose 8-bit parallel output port to drive a variety of peripheral devices. A POKE to a particular memory address will result in the number POKE'd appearing on the DATA lines and a pulse on the STROBE line. The address used in the POKE statement will depend on the slot in which the printer card is installed:

Slot used	Decimal Address	Hex Address
-----------	--------------------	----------------

Each time a byte is sent to the Printech II card, the strobe signal is generated. The strobe has the polarity indicated by the setup of the jumper configuration block.

If an acknowledge signal is provided, it can be tested for by reading location  $\$CNC1$  (where  $N$ =slot number) or decimal  $49345 + (N*256)$ .

If BIT 7 is set, no acknowledge has been received, if BIT 7 is clear an acknowledge was received.

SLOT #1 EXAMPLE:

```
10 IF PEEK (49345 + 1*256)<128 THEN PRINT "ACKNOWLEDGE RECEIVED":GOTO 30
20 GOTO 10:REM WAIT FOR ACK
30 POKE (16240), DATA
40 GOTO 10
```